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(21)Application number : 11-021241 (71)Applicant : HITACHI LTD

(22)Date of filing : 29.01.1999 (72)Inventor : NAGAYA SHIGEKI

MIYATAKE TAKAFUMI

FUJITA TAKEHIRO

NAGASAKA AKIO

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(54) IMAGE STORAGE DEVICE, MONITOR SYSTEM AND STORAGE MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an image storage device that is provided with an interface by which a time required for browsing and retrieval by a user can remarkably be reduced by retrieving monitor event information satisfying a browsing request of the user to select a browsed image and displaying the laid out image together with the monitor event information.

SOLUTION: A monitor event detection engine 620 detects a monitor event registered in advance from a video signal received from a monitor camera 200. A video output display program 630 reads monitor video data 161 and monitor event information data 162 from an auxiliary storage device 160 in response to entry by a user and displays a video image and monitor event information relating to the video image on a screen. An HTML generating program 640 dynamically generates an HTML of a monitored video image. A WEB server 650

distributes a WEB page thus generated to a remote personal computer 220 and gives an operation instruction from the user to a main control 610.

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The video signal inputted is digitized. As a time series image The image under the means to incorporate and current input A monitor event from an input image means to display, and an input image It is based on a means to detect, and the detected monitor event. An input image A means to associate and record the storing location of the image which remembered it to be a means to memorize the image judged "records on videotape" with a means to judge whether it would memorize, and the monitor event information that it corresponds, and a means to search monitor event information and an image according to an access demand of a user, Image storage characterized by providing the monitor event information sorted out, a means to arrange an image, and a means to display one or more layout results.

[Claim 2] Image storage characterized by judging with there being a "migration body" or the monitor event "lighting change" when the number of fields judged in

an input frame image to be dissimilarity size exceeds a predetermined value in a means to detect a monitor event according to claim 1.

[Claim 3] Image storage characterized by judging with there being the monitor event "change of background structure" when the time variation of the number of fields judged in an input frame image to be dissimilarity size exceeds a predetermined value in a means to detect a monitor event according to claim 1.

[Claim 4] Image storage characterized by judging with there being the monitor event "those with a face candidate field" when the number of fields judge that is beige in an input frame image exceeds a predetermined value in a means to detect a monitor event according to claim 1.

[Claim 5] Whenever [difference / of claim 2] is image storage which calculates the average value of a color or brightness for every block, and is characterized by calculating the absolute value of the difference during a corresponding block, respectively, and considering as those maximums from each of the image of a certain past, and the image inputted now.

[Claim 6] Whenever [difference / of claim 2] is image storage characterized by considering as the moving average deviation of the time series value acquired about the image of a certain past, and the input image by the present respectively in quest of the absolute value of the difference during the block which corresponds about the average value of a color or brightness for every

block.

[Claim 7] Image storage characterized by recording on videotape only when the monitor event which the user registered arises in an image storage judging means according to claim 1.

[Claim 8] Image storage characterized by changing image transcription spacing dynamically in an image storage judging means according to claim 1 according to change of the reinforcement of the detected monitor event.

[Claim 9] Image storage characterized by changing the pattern of two or more image transcription spacing beforehand decided in the image storage judging means according to claim 1 according to the class of detected monitor event.

[Claim 10] The medium of an image storage means according to claim 1 is a hard disk, DVD-RAM, and image storage characterized by being either of the flash memories.

[Claim 11] Image storage which stores the characteristic quantity showing Discernment ID and the location of an event, time amount, and an event, and the count result used for the judgment of an event for every field as monitor event information according to claim 1, and is characterized by enabling it to search and classify at the class and characteristic quantity of a monitor event.

[Claim 12] Image storage characterized for a representation image by one sheet or using more than one and arranging these two-dimensional about monitor

event information according to claim 1, the monitor event information stored by time series as a means to arrange an image, and an image.

[Claim 13] Image storage characterized by using the very first, the very end, or the frame image that hits in the medium exactly as a representation image of a monitor event according to claim 12 out of the time amount section when the monitor event has occurred.

[Claim 14] Image storage with which characteristic quantity showing a monitor event is characterized by using the frame image of a part which is changing the maximum, the minimum, or rapidly as a representation image of a monitor event according to claim 12.

[Claim 15] Image storage characterized by classifying into two or more units and arranging to near physically according to it using continuing in time or being close about monitor event information according to claim 1, the monitor event information stored by time series as a means to arrange an image, and an image.

[Claim 16] Image storage characterized by seeing time and arranging two-dimensional with a broth by the time bases for every 15 minutes on a day and the morning and an afternoon at the time as a method of arranging monitor event information and an image according to claim 15.

[Claim 17] Image storage characterized by arranging monitor event information to the tree structure by the time bases for every 15 minutes on a location, a day,

and the morning and an afternoon at the time, and arranging the content and generating time of day of a monitor event as a leaf of the tree structure as a means to arrange monitor event information and an image according to claim 1.

[Claim 18] Image storage characterized by displaying as animation all the frame images that are monitor event units and are contained in it as a means to arrange monitor event information and an image according to claim 1 on time order.

[Claim 19] Image storage characterized by displaying the transition graph of characteristic quantity which shows the hysteresis of the past of a monitor event as a means to arrange monitor event information and an image according to claim 1.

[Claim 20] Image storage characterized by changing in order and arranging so that it may have the list display which shows the hysteresis of the past of a monitor event as a means to arrange monitor event information and an image according to claim 1 and two or more usual newest representation images may be displayed.

[Claim 21] Image storage characterized by changing dynamically the display of other fields which combine two or more layout results according to claim 12 to 20, and remain according to the user actuation to each field as a means to arrange monitor event information and an image according to claim 1.

[Claim 22] Image storage characterized by making it possible to peruse a monitor result, recording a monitor image by making it become independent, respectively in a means to memorize a monitor image according to claim 1, and a means to display a layout result.

[Claim 23] Image storage characterized by giving a display which the condition under current monitor record understands in image storage according to claim 22 in case a monitor result is perused.

[Claim 24] In a means to display the means and layout result which arrange monitor event information and an image according to claim 1 A means to arrange monitor event information and an image from monitor event information and an image As a means to consider as a means to generate a layout result according to claim 12 to 21 as HTML (Hyper Text Markup Language) data, and to display a layout result Image storage characterized by enabling access of a monitor result simply even if it combined the WEB server which sends out the generated HTML data and was a remote place.

[Claim 25] Image storage characterized by losing the image copy of data and migration inside a server by storing the representation image for every frame in the graphics format which can be displayed by WEB, and outputting a HTML tag <an IMG solvent refined coal= image data storage pathname> as HTML data which display this in a means to generate a layout result according to claim 24

as HTML data.

[Claim 26] Image storage characterized by enabling it to move and display simply only by clicking this by outputting as a character string which sandwiched the HTML tag which display a representation image, or the character string showing a monitor event by the <A HREF= another layout display ? parameter> and </A> in a means to generate a layout result according to claim 24 as HTML data.

[Claim 27] Image storage characterized by having a means to generate these HTML data dynamically in a means to generate claim 25 and the layout result of 26 publications as HTML data, from the monitor event information by which renewal of an addition is carried out every moment, and an image.

[Claim 28] The image storage classify a detection means detect image change from the inputted image, an image storage means memorize selectively the image by which the input was carried out [above-mentioned] based on the description of the above-mentioned image change, and the above-mentioned image change, based on the characteristic quantity, and carry out having a means memorize the information about this change, and the storing location of the above-mentioned image storage means of a corresponding image as the description.

[Claim 29] Image storage characterized by having a display means to search

and display the image which corresponds based on the information about the above-mentioned change in image storage according to claim 28.

[Claim 30] A detection means to detect a monitor event from the inputted image, and a judgment means to judge whether the above-mentioned image is recorded on videotape according to the above-mentioned monitor event, A means to digital-signal-ize the image judged that records on videotape, and to memorize it, Image storage which classifies the information on the monitor event corresponding to the memorized image according to the class of this monitor event, and is characterized by having a means to memorize with the storing location information on the this memorized image, and a retrieval means to search a corresponding image based on the information about the above-mentioned monitor event.

[Claim 31] An image display means to display the inputted image, and a detection means to detect a monitor event from the inputted image, A judgment means to judge whether the above-mentioned image is recorded on videotape according to the above-mentioned monitor event, A means to classify the information on the monitor event corresponding to the image remembered to be a means to memorize the image judged that records on videotape according to the class of this monitor event, and to memorize it with the storing location information on the this memorized image, Monitoring system characterized by

displaying a corresponding image based on the information about the monitor event which has a retrieval means to search a corresponding image, and a display means to display the information about the above-mentioned monitor event, based on the information about the above-mentioned monitor event, and was chosen on the display screen.

[Claim 32] The step which memorizes the image judged that records on videotape with the step which judges whether a monitor event is detected from the inputted image and this image is recorded on videotape in memory in memory, The step which relates the information concerning the monitor event corresponding to the memorized image with the this memorized image, and memorizes it, The record medium with which the step which searches the image corresponding to the information which starts a specific monitor event from the image memorized by memory, and the step which displays the searched image on a display were recorded and in which a computer readout is possible.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is in offer of the image storage in which access and retrieval are possible by 1/dozens of image transcription time amount about the monitor image which was concerned with the image recording device used in the monitor image field, and carried out long duration record.

[0002]

[Description of the Prior Art] While a supermarket, a convenience store, an elevator, etc. have receipts and payments of people frequently, the surveillance camera aiming at crime prevention and an arrest is installed in the part on which the near staff who manages and maintains that cannot keep eyes easily. the gestalt (it will be called an online monitor) which makes human being watch the image brought together in such monitoring system, and an image -- accumulating -- after the event -- when required (criminal generating etc.), the gestalt (it will be called an are recording mold monitor) which carries out access retrieval is large, and there are two. Since a labor cost is hardly applied compared with an online monitor, the gestalt of an are recording mold monitor is used widely. Under this are recording mold monitor, a timelapse video recorder is mainly used for are recording of the acquired image.

[0003] With a timelapse video recorder, based on the usual video camcorder, spacing of the frame image image transcription usually performed 30 times per second is extended from about several frames in 1 second, and it changes so

that an image can be recorded sporadically, so that the image for hundreds of hours can be accumulated. Record of about 180 hours (about eight days) is possible by recording on videotape by 1 frames per second by the common timelapse video recorder of the video camcorder base for 120 minutes using the tape media which can be recorded on videotape. If spacing of a frame image transcription is extended, record of long duration is still more possible, but since there is risk of the object for a monitor being missing from a record image, a actual employment top does not almost have extending 1-second or more spacing. Moreover, although it is also possible to use tape media with the chart lasting time for 120 minutes or more, since there is a problem of the endurance (fracture) of tape media, a tape is used for 120 minutes. The longest image transcription time amount of the timelapse video recorder of the video camcorder base is about 180 hours from such a situation. Image record is performed in order toward an end from the head of a tape. If it records to a end of tape, it rewinds automatically, and from the head of a tape, overwrite will be performed and it will go. Thus, the image of a maximum of 180 hours before is always stored. The access approach of an image is almost the same as the usual video camcorder. However, since it will become 30X if it reproduces like the video tape recorded on videotape ordinarily as it was, it can reproduce also at a number sheet [of seconds] rate.

[0004] Moreover, by some timelapse video recorders, there are some which a recording method is digitized and are recorded on a hard disk. By the timelapse video recorder of the VHS video camcorder base, this repeats record and a halt mechanically and solves the trouble of being as tape media deteriorating at the time of playback **** [and]. [that a tape head breaks down] What adopted such a digital storage method is called a digital timelapse videocassette recorder in distinction from the thing of the method recorded on the conventional tape media.

[0005] Thus, by the timelapse video recorder, although are recording of long duration was possible, there was a big problem in playback and access of the accumulated image. First, it is the point of taking several times as much time amount as the image transcription time amount (a tape 120 minutes) which an archive medium has in checking all, by 180 hour in the first place. In order to perform retrieval and access in the condition that filing of the part which is recorded and reproduced and that the second has a meaning as a monitor image, and the thing which is not should look for coincidence and by turns is not carried out, it is the point that effectiveness is dramatically bad. In the actual condition, since it cannot but reproduce simply from a tape head and vague access must be performed, it is the situation which is easy to overlook the target image.

[0006] As mentioned above, in access of the are recording image in a timelapse

video recorder, concentrating on distinction of an image over long duration was called for, and it had become a user's pain.

[0007] On the other hand, although it is thought that there is already approach combined with the feeling sensor of a man like an infrared sensor, and it can be solved (1) By the timelapse video recorder of the VHS video camcorder base A failure rate increases rapidly by turning on and off with the frequent machine part which performs image transcription / halt actuation. (2) the operating distance of the feeling sensor of people, and the point of the sensibility of a sensor -- (3) with scarce dependability -- in employment of a actual timelapse video recorder, it was hardly used and had not resulted [from troubles, like new installation cost starts] in the solution in question.

[0008] The origin-trouble in the conventional timelapse video recorder is to only accumulate by time order, without classifying the image inputted in any way. It will be made easy to perform classification and filing to compensate for change (example: receipts and payments of people, change of supply arrangement, etc.) produced in a monitoring station, and to look for later, if human being performs a direct monitor and takes a memorandum. Moreover, only the part which is likely to suit at a demand according to a content (example: an invader's face image, existence of the destruction and the theft of a supply) to look for also in access is taken out roughly, and the device of searching thoroughly from there is given. If

the time amount which supervises becomes long, such a device is much more important.

[0009] If filing, the classification, and ****** which human being who stated previously is performing also by the timelapse video recorder can be performed, it will become possible to reduce remarkably the mental burden which reduces substantially the time amount which retrieval had taken until now and which is both placed on a user.

[0010]

[Problem(s) to be Solved by the Invention] As mentioned above, the conventional image store (timelapse video recorder) had a problem about the method which classifies and arranges an image and accumulates it, and the access method for looking for the image made into the object.

[0011] The technical problems which this invention tends to solve are various monitor events (receipts and payments people) produced in the location used as the object for a monitor. Detect [whether the face is reflected and or not] an environmental physical change etc., and according to the class of the event, classify and arrange an image and it is accumulated. It is in offer of the record medium with which the image storage equipped with the interface which shortens substantially the time amount required in case a user peruses and searches, monitoring system, and the monitor approach were recorded and in

which a computer readout is possible.

[0012]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, As opposed to the input image means and input image which display the image under a means to input and digitize an image to time series, and current input The storing location of the image remembered to be an image storage means to memorize the image judged "records on videotape" with whether an input image is memorized based on a monitor event detection means to detect a monitor event, and the detected monitor event, and the image transcription judging means and the image transcription judging means of judging, The image which retrieves and peruses the monitor event information that the access demand of a monitor event storage means and a user which records the detected monitor event information is filled is sorted out. A surveillance intelligence display means to display one or more image sorting arrangement means to arrange with monitor event information, arranged images, or monitor event information is provided.

[0013] The random access memory of a hard disk, DVD-RAM, and a flash memory is used for the medium of the above-mentioned image storage means and a monitor event storage means.

[0014] The above-mentioned monitor event detection means detects [by the

technique currently opened to JP,8-221577,A "migration body detection and an extractor"] the existence of a background structural change, the existence of lighting change, the existence of a migration body, etc. as a monitor event, respectively from whenever [between the input image of a clocking, and the image recorded on videotape in the past / difference] at the time of a sampling. Moreover, the monitor event "the event of a face turning to a camera side most" is detected by detecting a beige field by judging whether the candidate field of a face exists in the scene in which a migration body exists.

[0015] The above-mentioned image transcription judging means means judges whether it is "recording on videotape" for an image from the minimum storage time length specified by the difference of the latest monitor event, the class and hysteresis of the already detected monitor event, and current time with the image transcription time of day of the image memorized just before, the remaining capacity of the medium used for various storage means, and a user etc.

[0016] When judged with recording the above-mentioned monitor event storage means on videotape about these monitor event, the location where the image in equipment is stored, and the characteristic quantity showing the location and Camera ID (location ID), and the monitor event in the inside of generating, and the time and the frame image which were ended are memorized in a

predetermined location.

[0017] The above-mentioned image selecting arrangement means For example, "a list of the detected face image", "A list of the monitor events generated within 1 certain hour", "an animation display of the image recorded on videotape in the existing monitor event", For every access demand of users, such as "a list only at the time of change of the installation object of a monitoring station" and "distribution of the monitor event of a day", monitor event information is retrieved, a corresponding image is chosen and arranged, and a view whose user is legible is created. In addition, the rule algorithm about the layout for retrieval required for image selection and arrangement for every view is beforehand built in as a firmware of equipment.

[0018] With still more nearly another solution means, by adding a means synchronize with the above-mentioned equipment the image or monitor event information by which it was indicated by two or more according to access actuation of a user, the interface with which two or more views cooperate and are displayed is realized, and the equipment which shows a user monitor event information and an image on many sides and efficiently is realized.

[0019]

[Embodiment of the Invention] Hereafter, one example of this invention is explained to a detail.

[0020] Drawing 1 is an example using the image storage of this invention of monitoring system. The video signal from a surveillance camera 200 is inputted from the video input terminal 110 of the image store 100, and is recorded as a digital image. The recorded digital image is displayed on a display 210 as an analog image from the video outlet terminal 110. Moreover, the recorded digital image is sent to the personal computer 220 of a monitor center through WAN from the LAN terminal 140. The telephone line etc. is available in that case. The image store 100 is controlled by directions through a touch panel 130 and a pointing device 190.

[0021] The conventional surveillance camera and conventional display of an analog can connect the monitor device connected to the image store 100 of this invention as mentioned above as it is. Furthermore, the point that a monitor image can be transmitted far away through a network is the function which was not in the conventional timelapse video recorder.

[0022] Drawing 2 is an example of the system configuration of the image storage which is this invention. Fundamentally, it is the same as the system configuration of the digital computer used for the current general-purpose target.

[0023] 111 is an A/D converter which changes the video signal from a surveillance camera into a digital image first. The changed digital image is incorporated by video memory 118 at the same time it incorporates it in memory

170 through an interface 112.

[0024] Video memory 118 stores the image displayed on a display 210 as digital data. 119 is the D/A converter of the class currently generally called RAMDAC, reads serially the data written to video memory 118 according to scanning-line speed, and draws on a display 210. Therefore, shortly after updating the data of video memory 118, the content of updating is reflected in the content of a display of a display 210. Even if it is a device for displaying an image, for example, displays 210 may be small CRT and a plasma display and are liquid crystal type display devices, they are not cared about.

[0025] A continuous animation can be displayed on a display by repeating incorporation of such an image by the frequency of about 30 seconds.

[0026] Auxiliary storage units 160 are mass recording apparatus, such as a hard disk, and are equipment for recording digital data semipermanently. This may be the recording device of the type which can detach and attach only a record medium like DVD-RAM and a flash memory in being what can be detached and attached from a body the whole storage like a PCMCIA type hard disk card.

[0027] CPU150 performs the software program for realizing functions explained by this invention, such as detection of a monitor event, image transcription control, and selection, arrangement of a display image. A program resides in memory 170 permanently and the data which are needed for program execution

are also stored here if needed.

[0028] NIC (Network Interface Card)139 transmits the image and monitor event information which were recorded on videotape through a network. The infrared light sensing portion 130 is an information input device from remote control.

[0029] From a touch panel 130, through an interface 131, the directions from a user are told to CPU150 and processed suitably.

[0030] 180 is a data bus which connects mutually between each device described above.

[0031] In the system configuration of the above image storage, the actuation at the time of recording a monitor image is explained first.

[0032] Record actuation is controlled by the control program 171 stored in memory 170. First, an image is incorporated from the video input terminal 110, and it considers as the train of each frame image, and stores in memory 170. Simultaneously, it transmits to video memory 118 serially, and an input image is displayed on a display 210. Next, a monitor event is detected from the frame image sequences stored in memory 170, and this is stored in memory 170. Only the image which should be recorded on videotape is judged and chosen from this monitor event information and control data 172. Finally, monitor event information and the selected image are stored in an auxiliary storage unit 160.

[0033] Next, the actuation at the time of a monitor image being perused by the

user is explained. The actuation at the time of access is controlled by the control program 171 stored in memory 170 like the time of record. First, according to the access demand of a user inputted through the touch panel 130, the monitor event information stored in the auxiliary storage unit 170 is transmitted on memory 170. Under the present circumstances, the internal record of monitor event information is read and what is not in agreement with a demand is deleted from memory. Next, the internal record of the monitor event information sorted out is read, the pathname of the image corresponding to a monitor event is acquired, and the corresponding image is transmitted to memory 170 from an auxiliary storage unit 160. Next, the monitor event information and the image on memory 170 are arranged in a gestalt legible to a user, and it transmits to video memory 118. The monitor event information and the image data which were transmitted to video memory 118 are displayed on a display 210 as it is as a monitor result. The above actuation is repeatedly repeated according to the input directions from a user.

[0034] The sampling period at the time of recording an image on videotape has come to be able to perform the image transcription of long duration more by being able to set up now freely and enlarging spacing by the timelapse video recorder generally. If a sampling period is extended too much simply, when the body which passes through the inside of the frame image of a camera is quick,

the leakage in an image transcription will arise, and it will become impossible however, to attain the object of a monitor. Then, the method in which a long duration image transcription is possible is explained below, without producing the leakage in an image transcription.

[0035] Drawing 3 , and 4 and 5 are drawings showing the method which records an image according to the monitor event detected by this invention.

[0036] Drawing 3 is drawing explaining the recording method which combined filtering by the monitor event with the conventional simple timelapse image transcription.

[0037] 300 is a timing chart which shows the generation period of a video signal. In the NTSC standard, 30 frames is generated in 1 second. On the other hand, a frame is thinned out in time by capturing an image with the specified sampling period.

[0038] 310 shows the timing chart of a sampling. He thins out a frame in 1/30 in time, and is trying to incorporate only one frame in this example at 1 second.

[0039] 320 expresses the content of an image at the time of a sampling. The surveillance camera is fixed, and when there is no change of a trespass object or a background (i.e., when the monitor event has not arisen) (320-2), input image sequences become almost the same. Then, when judged with "The image which is going to carry out a current image transcription is the same as the image

recorded on videotape last time [=] the monitor event has not produced", the memory consumption for an image transcription is excluded by omitting an image transcription.

[0040] 330 shows the selected frame. Thus, if filtering by the monitor event is performed, the time zone with much change of an image will become fixed memory consumption, but if change, such as night, decreases, the memory consumption by the redundant image transcription will decrease, and the image transcription of long duration will be attained. Since the image of time amount with which the image transcription was omitted is the same as the image recorded on videotape before one of them, even if there is an image retrieval demand of the time of day when the image transcription was omitted, it becomes possible to express a result as an acting image.

[0041] Since it consists of monitor event information 162 including the time information from which the image transcription data 161 and it were acquired, when there is a retrieval demand with "display the image of time of day 1", by the example of drawing 3 , the image of time of day 0 can be displayed in a deputy.

[0042] Drawing 4 explains the image recording method by method with another drawing 3 .

[0043] 340 shows the timing chart of a sampling. Drawing 3 judges a monitor event, after performing sampling infanticide, but after detecting a monitor event

from all the frames of the video image by which the direct input was carried out, without carrying out sampling infanticide and determining the event section, 1 etc. time etc. records on 3 seconds with the sampling period specified beforehand at drawing 4 . The input image at the time of same 1 / 30 seconds as an input, then event generating is [spacing of a sampling] recordable.

[0044] This method is suitable, when you want to detect the motion direction of the migration body in a surveillance camera etc. as a monitor event, or when controlling dynamic image transcription spacing which states to the following (III).

[0045] Drawing 5 explains the method which controls dynamic image transcription spacing.

[0046] 350 and 360 show the timing chart of a sampling.

[0047] The fundamental rereeling reel of this recording method is the same as that of drawing 4 , and detection and record are performed for a monitor event from all the frames of an input video image, without carrying out sampling infanticide. A different point from drawing 4 is a point of changing a sampling period dynamically by drawing 5 to the sampling period in the case of record having been immobilization. A timing chart 350 shows the method which records by making monitor event information and a sampling period link.

[0048] For example, change of a frame image is detected as a monitor event. the newest frame image and the last frame image -- the difference of each pixel --

total is calculated respectively in quest of an absolute value. This value becomes large when a motion is intense, the time with what [much] moves in a camera image, and, and when a motion is small, it has the property to become zero mostly.

[0049] Using this property, according to the size of this value, when a value is small, a sampling period is extended to about per second 2 to 4 times, and when a value is large, a sampling period will be narrowed to about per second 30 times. Then, the monitor image recorded serves as a form almost near an animation, when a motion is intense, the time with what [much] moves in a camera image, and, and when change is small, it is recorded like Para Para and animation.

[0050] By this method, it can record that the change in an image serves as fixed range, for example, can record for every fixed motion to record actuation of people.

[0051] Moreover, it is also effective to give the control rule of the sampling period created beforehand like a timing chart 360. For example, when supervising the door which people enter from the exterior, it becomes important that an entrance person's face image is recordable. In this case, it becomes possible to record certainly on videotape the frame image which a monitor event (image change) is detected, a sampling period is made dense immediately after beginning record,

and is set up so that spacing may be extended gradually and it may go and in which the face was reflected by this.

[0052] The image transcription of long duration is enabled without producing the leakage in an image transcription of objects, such as actuation and a face, supervising according to this invention, as mentioned above, since the monitor event is performing judgment of image transcription activation, and control of image transcription spacing.

[0053] Drawing 6 , and 7 and 8 explain the screen at the time of the image image transcription and playback in the monitor image recording device of this invention. These outputs are displayed on the display 210 on which the touch panel 130 was put.

[0054] Drawing 6 is a screen at the time of an image image transcription. The field 400 which displays fundamentally the image by which the current input is carried out takes the lead, and is constituted. In the input image field 400, a superposition indication of the marker 402 which shows that current detection of the monitor event information display 401 and monitor events, such as a location and time, being carried out and an image transcription are performed is given, and a user understands actuation of a system at a glance. 403 is a carbon button which controls whether a system starts an image monitor.

[0055] ID (the name of a monitoring station: beforehand registered by the user)

which shows the location which the camera is projecting, a date, a time code (frame number within a time second and its second), etc. are contained in the monitor event information display 401.

[0056] To a user, the detection condition and image transcription condition of a monitor event by the marker 402 are operated as follows, for example, although it is the advice approach. If a system begins to detect a monitor event, it will begin a flash in yellow. It notifies that the image transcription (image data and monitor event information data transfer) to an auxiliary storage unit 160 has occurred by blinking red for a moment at the time of an image transcription.

[0057] 410 is a field which notifies a user of the hysteresis of the detected monitor event. Here, the wave graph 411 which shows the existence and reinforcement of monitor event information (example: frame difference value etc.) is displayed. Wave 411 is shifted leftward one by one according to time amount transition, and the newest monitor event information value is added to the right end of a viewing area 410 as a wave value. The display 412 showing time of day sets so that the viewing-area 410 lower part may understand overall time amount distribution of a data point 411. In this example, although it is indicating whether to be a front from the current event, absolute time (how many minutes is it when?) may be displayed.

[0058] It is the field where 420 notifies a user of the hysteresis of the detected

monitor event. Here, the representation image 421 and time of day 422 for every monitor event which were detected until now are displayed. In this example, the image corresponding to the latest monitor event is displayed on the upper part of a viewing area 420, and the representation image 421 and time of day 422 are arranged toward the bottom at new order below.

[0059] As for the viewing area 410-420, playback of an image transcription image is attained more by the pointing device 190 grade touching a graph part and an image part.

[0060] At the time of playback, it changes to the display of field 400 part like drawing 7 mentioned later, and the image recorded on videotape there is outputted.

[0061] For example, by touching the representation image part on a field 420, a series of image data 161 of the section which the corresponding monitor event generated is read from an auxiliary storage unit 160, and display playback is carried out on a field 400. Moreover, a touch of the wave graph part of a field 410 reproduces the image of the near monitor event section on a field 400 in time to applicable time amount. Synchronizing with this, the representation image of the displayed monitor event and the event before and behind that is displayed on a field 420. At this time, the vertical line of a color which is different on a graph so that the touched part may be fed back to a user is displayed.

[0062] In addition, although the field 400 which performs the display of a record image and a playback image in a screen at the time of record, and the other fields 410 and 420 are put side by side in this example, these may be independently displayed as a viewing area 400.

[0063] Drawing 7 explains the screen at the time of playback. At the time of playback, the carbon buttons which were suitable for playback actuation, respectively are newly displayed on the upper part and the lower part of a field 400. These carbon buttons are drawing displayed on a display 210, and an imagination carbon button realized with the combination of a touch panel 130. By touching these carbon buttons with a pointing device 190 etc., a system performs actuation equivalent to having pushed the carbon button.

[0064] The image reproduced is similarly displayed on a field 400 as the input image at the time of record.

[0065] The monitor event information corresponding to the image currently reproduced is displayed on 401.

[0066] The monitor event detection marker 402 is displayed also at the time of playback, and it deals in it. Although mentioned later, it is possible to record in the background in this invention also at the time of playback. for example, . which notifies that detection of a monitor event was also while the marker 402 was displayed and the user was perusing, when it was going to reproduce the

recorded image while the user was recording the monitor image, of course, when not recording on videotape in the background, a marker 402 is not displayed.

[0067] 430 is a carbon button for returning to a screen at the time of record of drawing 6.

[0068] The image with which a current indication of 431 is given with the total of the frame image data contained at the event section among the monitor event images which are carrying out current playback notifies a user of what frame it is.

[0069] 432 is a carbon button which controls playback of a playback image, a halt, reverse playback, top delivery, etc.

[0070] 433 is a carbon button for changing on the representation image list screen of drawing 8 mentioned later.

[0071] Drawing 8 is a screen which displays a list of the representation image for every detected monitor event. It is fundamentally the same as the viewing area 420 in drawing 6, and width of face is expanded also in a longitudinal direction, and the representation image 421 and time of day 422 are displayed on it side by side in order of a raster scan.

[0072] The carbon button 440 arranged in the triangular configuration up and down changes the content of the list display according to the direction of time amount. A push on a upside carbon button displays the content of the 1 display

unit quota on a current page in time. A push on a lower carbon button displays the content of 1 display unit part back. When it reaches to the beginning of the monitor event currently recorded, or the last, the carbon button of the direction which cannot progress is displayed in a thin color by actuation of a user, and it stops receiving a carbon button input by it.

[0073] If a user performs touch and selection in each representation image 421, it will change to the playback screen explained by drawing 7, and the image of the selected monitor event section will be reproduced.

[0074] Drawing 9 operates the image storage 100 from a remote place like a monitor center, and it records or it explains the user interface which reproduces and peruses a monitor image.

[0075] In this example, in order to perform control and access from the personal computer 220 in a remote place to the image storage 100, the WEB server and the WEB browser are used, respectively. Although mentioned later, a WEB server is made to build in the image store 100 side, and the WEB page 500 shown on the WEB browser of the personal computer 220 in a remote place is displayed. Hereafter, explanation of this page is performed.

[0076] A menu 510, the browsing carbon button 520, the URL display 530, and the browser status display section 580 are a part of user interfaces for control of the WEB browser which displays the surveillance intelligence page 500.

[0077] Field 550 ** which carries out the repeat display of the image of the monitor event section chosen by the field 570, the tree viewing area 560, or the list viewing area 570 which indicates that representation image by list about the field 540 which displays the newest time of day of monitor data besides the above-mentioned browser component, the field 560 which showed the monitor event the tree table in a date/time for every monitoring station, and the specified monitor event for every time is large, and this surveillance-intelligence page 500 consists of four viewing areas.

[0078] A field 540 shows a user whether it is a thing at the time of monitor data present on display being when. Generally this is difficult to always continue sending the newest information to a browser side from a server in the dialogue of a gestalt like WEB. That is, it is because it can show a browser only in the static condition of having gone back from a certain specific time of day (the CPU load which the network band in the middle of WAN etc. produces in both not being enough, the problem of cost of maintaining a communication line, and a server client is large). Therefore, when perusing a monitor result via a browser from a remote place while the image store 100 records a monitor image, it is for differing from the condition that the content of the page was accumulated in the interior of the image store 100 to often arise, and for the need of making a user conscious of the time difference to arise.

[0079] A field 560 offers the location which a user wants to peruse beforehand, and the interface which can reach time quickly by carrying out the tree view of the monitor event in a date/time for every monitoring station. A tree view consists of four hierarchies of 563 and the monitor event unit 564 sequentially from a top at a location 561, a date 562, and the time. If it clicks on the icon of each node of a tree with a mouse, when the low order node is not displayed, the thing of the image which the icon opened is replaced and a low order node display is performed. On the contrary, when displayed, it changes to the thing of the image which the icon closed, and actuation of hiding a low order node is performed. Thereby, a user can always open only the target node and can peruse it.

[0080] A click of the text part 565 of each node changes the content of a display of the image reproduction viewing area 550 or the list viewing area 570. For example, a click of the text part 565 displays the monitor event list of newest date/time of day in the range on a field 570 about the node of high order 3 hierarchy of 563 at a location 561, a date 562, and the time.

[0081] A click of the text part of the monitor event unit 564 which is a low-ranking node most reproduces the image transcription image of the monitor event section applicable to the image reproduction viewing area 550 shortly.

[0082] 570 is a field which is included at the specified time of day like 420 in drawing 6 and which displays a list of the representation image for every

detected monitor event. On a field, the time stamp 572 and the representation image 573 in which the location and the display 571 of a date which are indicating by the list, and the break for every time of day are shown are arranged. When time of day, such as the time of browser starting, cannot be given, a list of the representation image contained in the newest record time is displayed.

[0083] A click of the representation image 572 reproduces the image transcription image of the monitor event section which corresponds on the image reproduction viewing area 550.

[0084] By the conventional timelapse video recorder, since it only showed time order when reproducing a monitor result, it had taken time amount extremely.

[0085] On the other hand, by using the user interface stated by drawing 6 -9, according to time amount structure, it can show hierarchical, or two dimensions can be arranged in the shape of a tile, and the representation image which is easy to judge the content can show.

[0086] High-speed access to the object time which was impossible in the former is possible for a tree view, and since an image is reproducible immediately, when performing retrieval which attached most hit, effectiveness is demonstrated dramatically. Moreover, 2-dimensional arrangement makes it possible to overlook two or more monitor events roughly at once, and it makes it possible to shorten substantially the time amount needed when regarding as

Para Para.

[0087] By these, the efficient check of the content of the impossible high-speed access and monitor image is attained by the conventional timelapse video recorder. By our field test, it is actually checked that the time amount which retrieval takes can be reduced to about 1 / 30 to 1/100. Thus, this invention offers the high interface of the time saving effectiveness with sufficient user-friendliness compared with the conventional monitor image record device.

[0088] Drawing 20 explains a configuration from a viewpoint of a function about the image storage 100. A main component is five, the Maine control 610, the monitor event detection engine 620, the display program 630 for video outlets, the HTML generator 640, and the WEB server 650.

[0089] The Maine control 610 is the main function of a control program 171 itself, and controls the image storage 100 whole. The handle of the user input to a system is carried out by touch panel 130 and WEB server 650 course, and, specifically, actuation of the monitor event detection engine 620, the display program 630 for video outlets, the HTML generator 640, and the WEB server 650 is controlled.

[0090] The monitor event detection engine 620 is detected from the video signal into which the monitor event registered beforehand was inputted from the surveillance camera 200, and stores the monitor image data 161 and the monitor

event information data 162 in an auxiliary storage unit 160.

[0091] The display program 630 for video outlets outputs and displays the screen explained by drawing 6 . According to the input from a user told to the Maine control 610 via the touch panel 130, the monitor image data 161 and the monitor event information data 162 are read from an auxiliary storage unit 160, and an image and related monitor event information are displayed on a screen.

[0092] The HTML generator 640 creates HTML dynamically to the WEB page output of a monitor image explained by drawing 9 . First, the user actuation performed on the personal computer 220 is told to the Maine control 610 via the WEB server 650 from the WEB page 500. According to a user demand, the monitor image data 161 and the monitor event information data 162 are read from an auxiliary storage unit 160, and the HTML tag in which the location on the WEB server of monitor event information and an image is shown is written out into the HTML data prepared beforehand. This realizes dynamic generation of HTML.

[0093] The WEB server 650 tells the operating instructions from a user to the Maine control 610 while distributing the WEB page created in this way to the personal computer 220 of a remote site.

[0094] Drawing 11 , and 12 and 13 explain the approach of the monitor event detection performed with the monitor event detection engine 620.

[0095] Here, the existence of a migration body is described as an example.

[0096] First, each frame image 700 is taken out from the image inputted. Next, as shown in drawing 11 , a frame image is divided into two or more small rectangle fields 710, and the existence of image change is detected for each field of every.

[0097] The method described is used if it considers as the distinction method of image change (JP,8-221577,A "migration body detection and an extractor"). By this method, a background, a migration body, a background structural change, and illuminance change are detectable each view field 710 of every.

[0098] Hereafter, the migration body detection method used in each field is explained briefly.

[0099] First, the time of day when a migration body does not exist among the view fields on a frame image is chosen, and let this be a background image.

[0100] And the dissimilarity of an image is calculated between the newest images newly inputted as this background image each time. the brightness of each pixel of the location which corresponds as an example of this dissimilarity count -- a difference -- asking -- the whole image -- those square sums -- you may ask -- instead of [of brightness] -- the difference of the value of each RGB -- it is good also as a sum of squares.

[0101] In this way, if it looks at the obtained dissimilarity as a graph which

arranges and follows time order, the time amount section when a migration body exists will be in the condition of changing sharply. a case although it will be in a flat condition with little fluctuation in the time amount section when a migration body does not exist, when the time of day and the background which were decided as a background are completely the same -- namely, similarly as for the average of the section, the content is set to about 0 in image. Since the contents differ in image on the other hand when the structure of backgrounds -- an object is placed -- changes, although it is flat, the section average becomes more than fixed magnitude.

[0102] By using this property, it becomes possible to check the existence of a migration body, and the existence of change of background structure as the time amount section. What is necessary is to choose the image at the event of arbitration suitably, to ask for the time amount change graph of dissimilarity first, and just to consider the event of the even section being found as initiation, although it is or becoming a problem here determines the time of day which serves as a background what as the beginning. It becomes possible to be stabilized and to repeat this processing, if the time of day made into a background is updated when subsequent processing also has change of background structure (i.e., only when the configuration of a graph serves as the average more than flatness and constant value).

[0103] Supposing it colors the field where a migration body exists with the method explained above about each view field set up on the frame image (level attachment), it will become as it is shown in right-hand side drawing of drawing 11 .

[0104] Drawing 12 performs processing explained by drawing 11 about all frame images, and describes the image between space-time of the three dimensions as for which a frame image is arranged and made to time order. Out of this image between space-time, a migration body constitutes the partial stereo 720. The thing illustrating this is drawing 12 . If it looks at the image 730 between this space-time, the monitor event "there is a migration body" may consider that there is subregion 720 with a certain amount of magnitude. It is the lower graph which looked at this from another viewpoint. If the number of fields with the image change per frame is seen as a graph 740, a graph can consider that the above-mentioned judgment is the section 750 more than constant value. Thus, the determined section is distinguished as the section of a monitor event "migration body ****." And an initiation frame, a termination frame, section length, and the judgment result for every field are memorized to an auxiliary storage unit 160 as monitor event information 162.

[0105] In addition, although it is also one approach to consider that the whole image is one field and to judge it, the direction which divides as mentioned

above in a small region, and unifies the result is suitable for handling of a monitor event. For example, actuation of a detection engine can be made robust to small disturbance etc. Moreover, the field which is not included in a judgment can also be set up easily, or there is an advantage of being able to describe briefly the below-mentioned retrieval processing and representation screen decision processing.

[0106] Also when detecting change (reshuffle of an object etc.) of other monitor events, for example, background structure, the appearance of a face field, etc., it becomes detectable [stable] by detecting per field in a frame as mentioned above.

[0107] In addition, although the view field was made into the rectangle in this example, there is no problem in any way as any of other configurations. Moreover, it is also possible to make effective area of the field to distinguish small, performing distinction stabilized in the big field by giving overlap as shown in drawing 13 , and performing logical operation about the distinction result for every field here, although the field was put in order finely.

[0108] Drawing 14 explains the DS of the monitor event information 162.

[0109] The monitor event information 162 is RDB (Relational Database: relational database), and consists of four tables, the location table 162-1, the image table 162-2, the event table 162-3, and the time amount tree table 162-4.

[0110] The location table 162-1 is a table which stores the discernment ID 162-1-1 of the camera to which the monitor image recording device 100 was connected, and a name 162-1-2 and the name 162-1-3 of a monitoring station. In order to abolish the redundancy of each record of the image table 162-2, it is prepared independently.

[0111] The image table 162-2 is a table for controlling each frame image memorized by the monitor image recording apparatus 100. It consists of items of the frame image ID 162-2-1, a location ID 162-2-2, the image transcription date 162-2-3, the image transcription time second 162-2-4, a frame number 162-2-5, the image file pathname 162-2-6, the event class 162-2-7, and the event attribute data 162-2-8. A location ID 162-2-2 is the same item as the location ID 162-1-2 of the location table 162-1, and a actual ID number is stored. The image transcription date 162-2-3, the image transcription time second 162-2-4, and a frame number 162-2-5 are time information when a frame image is recorded. Since the date and the time second have divided into the high speed in general RDB as data type which can carry out a handle in many cases, these have been divided into three in this example. The pathname of the image file currently recorded in the system is stored, and the image file pathname 162-2-6 is used for reading actual image data at the time of playback of a monitor image, or retrieval. The event class 162-2-7 is the field which shows whether the stored

frame image will be stored by what kind of monitor event. A bit flag shows the class of monitor event supposing the case where two or more monitor events lap. It is prepared in order to filter every monitor event at the time of monitor image reproduction and retrieval. The event attribute data 162-2-8 is a field which stores the characteristic quantity data for every field used as the antecedent basis of monitor event detection.

[0112] The event table 162-3 handles the section information on a monitor event. It consists of an event ID 162-3-1, an initiation frame ID 162-3-2, a termination frame ID 162-3-3, and a representation frame ID 162-3-4. The frame image ID 162-2-1 of the image table 162-2 is stored in the initiation frame ID 162-3-2 and the termination frame ID 162-3-3. Similarly, the frame image ID 162-2-1 determined by the representation image decision algorithm of the after-mentioned [the representation frame ID 162-3-4] is stored.

[0113] The time amount tree tables 162-4 are direct and a table prepared in order to access a high speed in time amount assignment to monitor event information like the tree viewing area 560 of drawing 9 . It consists of a node ID 162-4-1, parent node ID 162-4-2, the node search key 162-4-3, the sequence 162-4-4 in a node, an event ID 162-4-5, an event class 162-4-6, and a location ID 162-4-7. Although this table is redundant, it is prepared in order to raise the throughput at the time of monitor result access. Although it can create

dynamically fundamentally from three, the location table 162-1, the image table 162-2, and the event table 162-3, since this count is needed by very high frequency, in playback / access actuation of a monitor image, it aims at making the load of a system small by preparing as a table independently. It consists of a node ID 162-4-1, parent node ID 162-4-2, the node search key 162-4-3, an event ID 162-4-4, an event class 162-4-5, and a location ID 162-4-6. A node ID 162-4-1 and parent node ID 162-4-2 are the fields in order to express the tree structure on a table. The node search key 162-4-3 is a character string for accessing a low-ranking node most directly from a location, and a date and a time second, and is set up as a major key for searching this table by hash. Since it is a character string, key creation is easy, and the count cost for retrieval is small and ends. The event ID 162-4-4 is the same as that of the event ID 162-3-1 of the event table 162-3, and a actual ID number is stored. The event class 162-4-5 and a location ID 162-4-6 are formed in order to filter every monitor event at the time of monitor image reproduction and retrieval.

[0114] In addition, although it is the timing by which data generation of these tables is carried out, the location table 162-1 is beforehand created by the user, before a monitor is started. The image table 162-2 and the event table 162-3 are data dynamically generated at the time of actual monitor image record. Although it is data with which the time amount tree table 162-4 is also generated at the

time of record, this is also secondarily generated from the content of the image table 162-2 and the event table 162-3. This is because it is prepared in order to raise the throughput at the time of monitor result access, as stated previously.

[0115] According to the above DS, the image store 100 becomes possible [searching and showing the recorded monitor event and an image at a high speed]. Moreover, it is newly made possible that it was impossible at the hardware-system configuration shown in drawing 2 and drawing 10 , and the old monitor storage system of perusing according to the DS which became independent for each frame image [every] of this while recording a monitor image.

[0116] Drawing 15 explains the algorithm which determines the representation screen in the monitor event section.

[0117] The case which displays the monitor event which the image store 100 detected like 420 or 500 is considered. Which in the case of the event which shows migration object presence, is chosen as an image representing the monitor event section is the important point which influences the effectiveness of access of a monitor result greatly.

[0118] For example, if the head frame of the section is used as a representation image, it will often happen that information about the detected migration body can hardly be shown only by some migration bodies being reflected. Even if this

is the last frame, it is the same. Although considering as the medium of a head frame and the last frame simply is also considered, when two mobiles are detected continuously and become the one section, the trouble that an image in which both are not reflected out of just between will be represented occurs. Then, the same approach as having used for control of the sampling period stated by drawing 5 will be used.

[0119] When you detect a monitor event, suppose that a graph like 900 was obtained. First, the approach of using as a representation screen the frame 910-4 from which a graph value serves as max is thought in a case like detection of a face field. Next, since it is considered a case which the migration body of thing equal plurality that two or more maximal value appeared passed within the one event section in the case of the existence of a migration body, it considers that the maximal value 910-2 which came out first is temporary representation, and how to adopt this is also considered.

[0120] Next, the method which realizes monitor graphic display in the user interface presented by the WEB browser explained by drawing 9 by HTML is explained. In addition, it is about the technical term used below. It is explained to URL (http://w3c.org/) in detail.

[0121] By drawing 16 , first, when the representation image 573 in the list viewing area 570 is clicked, the method which realizes reproducing the image

transcription image of the monitor event section which corresponds on the image repeat display field 550 is explained. Respectively, it shall consist of independent HTML viewing areas called each field with a frame. Here, for explanation, a list viewing area will be called Frame Digest and an image reproduction viewing area will be called Anime.

[0122] Digest and Anime are HTML data dynamically generated according to the condition by the side of a WEB server instead of static HTML data. In order to generate these dynamic HTML data, server side scripts (script which operates by the WEB server side), such as CGI (Common Gateway Interface) and ASP (Active Server Pages), are used.

[0123] 1000 is the example of the HTML text data of Digest. In this example, in order to display the character string showing the time of day of a monitor event, and its representation screen in the shape of a tile as shown in 1010 and 1020, the <TABLE> tag is used. A tag 1030 corresponds to display 1010 and the tag 1040 supports the display 1020. Although the display image 1020 is a clickable field, this is realized by enclosing the image tag 1042 which displays the representation image 573 using the hypertext tag <A> shown in 1041. And the image for every corresponding monitor event is reproduced by specifying Frame Anime as a link jump place, and changing the content of a HTML output dynamically according to the clicked image.

[0124] In order to change a response place, the character string which serves as a parameter after question mark at the jump place of HREF which is the element of <A> is written in beforehand. As shown in 1051, the data which can take out the frame image ID or it which shows the record range of the image table 162-2 as a parameter written in are suitable.

[0125] First, the flow of processing is briefly explained until, as for the flow chart 1100 of drawing 17 , an image is reproduced from the click of the representation image 573 to on the image repeat display field 550. First, if the click click of the representation image 573 is carried out (1110), the jump to the frame Anime specified by the WEB browser side will take place (1120). However, the HTML data displayed on Anime are dynamically determined and generated from the parameter 1051 passed at the time of a jump (1130). The frame image ID in which the range on the image table 162-2 is shown is taken out (1132), REKOTO which corresponds to an image table is searched, and each image pathname is taken out from the character string (1131) specifically substituted for parameter name sJumpKey as URL (Universal Resource Locator) (1133). And this is outputted in a HTML format (1134). A WEB browser displays the HTML data obtained in this way on Frame Anime (1140). It displays as animation by making into visible and invisibility the frame image which finally corresponds according to user actuation (1150).

[0126] Next, the procedure in which the HTML text data of Digest is generated by 1200 of drawing 18 is explained. Here, it explains supposing the case where all data are displayed without specifying especially the range of a list display. First, the node which has a root node (Record ID is the thing of -one) used as the root of a time amount tree in parents is searched from all records (1210). Next, this is sorted every location ID 162-4-7 (1220). Next, let a root node be a parent node (1230). If a parent node is decided, in search of a node with the same parent node ID, it will sort according to the sequence in a node, and a list will be created (1240). In this way, about the made node list, migration to all the leaf nodes within the tree structure is repeated recursively below (1250).

[0127] First, a current node investigates a branch node or a leaf node (1260). If it is a branch node, it will get down to a lower layer node recursively (1290). If it is a leaf node, sJumpKey will be created (1270) and the HTML output of this will be carried out (1280).

[0128] Creation of sJumpKey specifically serves as the following procedures. First, the record which is in agreement with the event ID 162-4-5 which a node has from the monitor event table 162-3 is searched (1271), and the initiation frame ID 162-3-2 and the termination frame ID 162-3-3 are acquired. Next, the record which is in agreement with the representation frame ID 162-3-4 from an image table is looked for (1273), and the representation image pathname is

acquired as URL (1274). The above processing is repeated about all leaf nodes.

[0129] Drawing 19 explains how to change the list viewing area 570 from the tree view 560 showing a time amount tree dynamically. The frame name of the tree viewing area 560 will be called TimeTree for explanation.

[0130] When a user points at the node which is not the leaf of a tree display with a pointing device 190 and a display is changed, the range of time is specified as Frame Digest. A parent node gives concretely on the time amount tree table 162-4 in internal processing, and it is equivalent to a ******** case. As for the back, HTML data are dynamically generated by the same procedure as drawing 12 explained.

[0131] 1300 shows the example of HTML which realizes this jump. Here, the <DIV> tag is used in order to realize the tree structure opened and closed dynamically. The value of the parameter sDigestKey passed with each hyper-jump tag <A> is changed so that an output may be changed at the point clicked like the example of Anime. It is the character string which consists of "location name" + "time" as it indicated to be to 1310 and 1320 to use as this value. This is the same as that of the node search key 162-4-3 in the time amount tree table 162-4, and has the structure where retrieval for drawing Frame Digest can be performed promptly.

[0132] Drawing 14 explains the actuation at the time of clicking the branch node

of a time amount tree structure display of Frame TimeTree.

[0133] First, if a branch node is clicked (1410), the jump event to Frame Digest will arise (1420). Since HTML which Frame Digest displays is a dynamic page, content generation processing starts it (1430). The string value of sDigestKey given as a parameter at the time of a jump is specifically taken out (1431), and the record which is in agreement from the time amount tree table 162-4 by making this into a search key is searched (1432). In this way, the node ID 162-4-1 of the detected record is made into a parent node, and the rest performs HTML data generation of a list display screen in the same procedure as 1200 having described (1433). Finally this HTML data is displayed on Frame Digest (1440).

[0134]

[Effect of the Invention] According to this invention, since image transcription data are memorized in the memory in which random access is possible, it can peruse to record and coincidence. Moreover, in that of ****** by which an image is digitized, even if it repeats an image transcription how many times, image quality degradation does not arise. Furthermore, since an image is recorded at suitable spacing only about the monitor event (it is [whether receipts and payments of people and a face are reflected and] an environmental physical change etc.) which the user specified, the amount of memory required for an

image transcription is reduced, and a prolonged image transcription is attained. Since an image classifies and arranges and it accumulates by various monitor events in case a monitor image is memorized, it can narrow down to the monitor event made into the object at the time of access, and an image can be looked for. Furthermore, by showing time distribution of a monitor event superficially, the time amount required in case a user peruses and searches is shortened substantially, and it is effective in the ability to offer the interface which can perform migration to the data made into the object in a hyper-jump.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is an example using the image storage of this invention of monitoring system.

[Drawing 2] It is an example of the system configuration in the image storage of this invention.

[Drawing 3] It is drawing which explains the sampling of a fundamental frame image among the methods which record an image according to the monitor event detected by this invention.

[Drawing 4] It is drawing which explains the sampling of a frame image based on the existence of a monitor event among the methods which record an image according to the monitor event detected by this invention.

[Drawing 5] It is drawing explaining how to control the sampling period of a frame image dynamically based on monitor event fluctuation among the methods which record an image according to the monitor event detected by this invention.

[Drawing 6] A screen is explained at the time of record among the screens at the time of the image image transcription and playback in the monitor image recording device of this invention.

[Drawing 7] A screen is explained at the time of playback among the screens at the time of the image image transcription and playback in the monitor image recording device of this invention.

[Drawing 8] The list display screen is explained among the screens at the time of the image image transcription and playback in the monitor image recording device of this invention.

[Drawing 9] The image storage of this invention is operated from a remote place like a monitor center, it records or the user interface which reproduces and peruses a monitor image is explained.

[Drawing 10] About the image storage of this invention, a configuration is explained from a viewpoint of a function.

[Drawing 11] In the approach of the monitor event detection performed with the monitor event detection engine of this invention, the setting-out approach and the detection result at the time of a view field are explained.

[Drawing 12] In the approach of the monitor event detection performed with the monitor event detection engine of this invention, the image between space-time obtained by setting out of the view field in drawing 11 is explained.

[Drawing 13] In the approach of the monitor event detection performed with the monitor event detection engine of this invention, the setting-out approach of another view field is explained.

[Drawing 14] The DS of the monitor event information on this invention is explained.

[Drawing 15] The algorithm which determines the representation screen in the monitor event section of this invention is explained.

[Drawing 16] The method which realizes monitor graphic display in the user interface presented by the WEB browser of this invention by HTML is explained.

[Drawing 17] From the click of the representation image on the list image display screen of this invention, the flow of processing is briefly explained until an image is reproduced on an image reproduction viewing area.

[Drawing 18] The procedure in which the HTML text data on the list image display screen of this invention is generated is explained.

[Drawing 19] How to change the list display screen from the time amount tree tree view of this invention dynamically is explained.

[Drawing 20] The actuation at the time of clicking the branch node of a time amount tree structure display of this invention is explained.

[Description of Notations]

100 -- Image storage,

110 -- Video input terminal,

111 -- A/D converter

119 -- D/A converter

120 -- Video outlet terminal,

130 -- Touch panel,

139 -- Network Interface Card (NIC),

140 -- LAN terminal,

150 -- CPU,

160 -- Auxiliary storage unit,

170 -- Memory,

180 -- Data bus,

190 -- Pointing device

200 -- Surveillance camera

210 -- Display,

220 -- Personal computer.